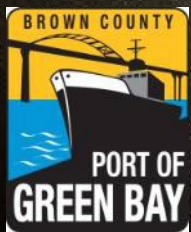


# Cat Island Chain Restoration

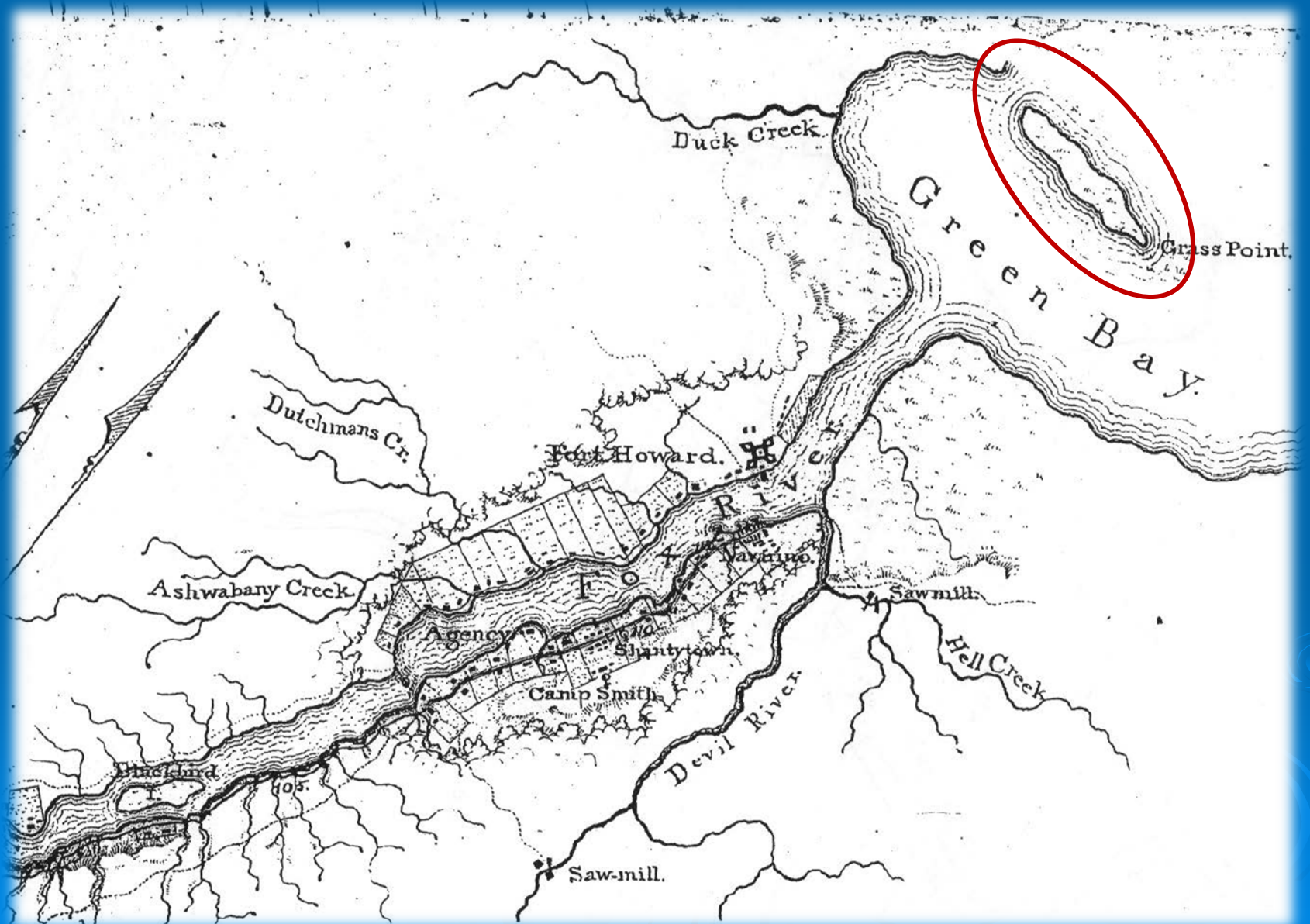


**Dean Haen**

*Brown County Port & Resource  
Recovery Department*



# 1820s Fox River Military Road Map to Fort Howard





# 1845 Chart of Green Bay & Fox River

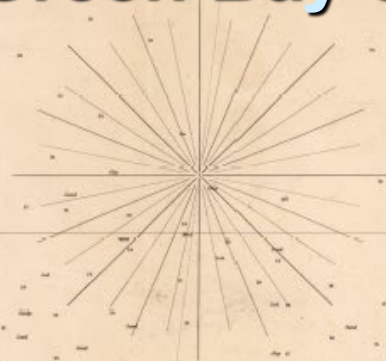


## GEOGRAPHICAL POSITIONS

Latitude, Right Angle Long Tail Point	44° 12' 0"
Longitude, adopted, West from Greenwich	87° 54' 0"
Do. " " " " " "	87° 54' 0"
Do. " " " " " "	87° 54' 0"
Do. " " " " " "	87° 54' 0"

## NOTES

The soundings are reported by the ship and are subject to the change of water in July 1845.  
The soundings are reported by the ship and are subject to the change of water in July 1845.  
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## SALENS OBSERVATIONS

The passage through Green Bay from the middle entrance to Rock Island Green Bay is very narrow and is subject to the change of water in July 1845.  
The passage through Green Bay from the middle entrance to Rock Island Green Bay is very narrow and is subject to the change of water in July 1845.  
The passage through Green Bay from the middle entrance to Rock Island Green Bay is very narrow and is subject to the change of water in July 1845.

The bars on the vertical land rising in the pointed rock and marked with red numbers, these in the past have been pointed black and marked with red numbers, these in the past have been pointed black and marked with red numbers.

In the middle of the channel the bottom is hard of after passing through the bar, it is hard and rocky, and is subject to the change of water in July 1845.

The depth of water is subject to the change of water in July 1845.

The current is subject to the change of water in July 1845.

The current is subject to the change of water in July 1845.

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The current is subject to the change of water in July 1845.

The current is subject to the change of water in July 1845.

## HEAD OF GREEN BAY

AND

## ENTRANCE TO FOX RIVER, WISCONSIN

From Traverse under the direction of the

BUREAU OF TOPOGRAPHICAL ENGINEERS WAR DEPARTMENT

in accordance to Act of Congress relating to

## SURVEY OF THE NORTHERN AND NORTH WESTERN LAKES

commenced in 1860 by

Capt. W. G. HILLMAN and Lieut. J. W. HICKMAN Corps Top. Eng.

with corrections to date by

Lieut. W. F. KASSNER Corps Top. Eng.

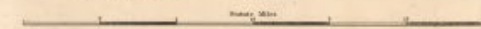
under the orders of

Capt. J. W. HICKMAN Corps Topographical Engineers

1863

Scale of Miles

Scale of Yards



Published by authority of the War Department

Approved by W. D. Loring

under the direction of Capt. J. W. H. Top. Eng.

Washington 1863

AM. GEOG. SOC.

No. 1772





# Cat Island Chain - 1938





A historical aerial photograph of the lower Green Bay area. The image shows a vast expanse of water and marshland. In the foreground and middle ground, there are numerous small, irregular islands and peninsulas separated by narrow channels of water. The water appears a deep blue, while the marshes and mud flats are a lighter, greenish-brown color. In the background, a line of land with some buildings and trees is visible under a hazy sky.

## Historic Western view of lower Green Bay

- Expansive emergent marshes (e.g. Duck Creek delta, Peats Lake)
- Numerous small islands
- Beaches and mud flats
- Submerged aquatic plant beds





Bass Islands

Willow Island

Cat Island

Lone Tree Island

Navigation Channel

Grassy Island

1966 during low water levels  
Islands extend 2.5 miles into Green Bay

*Photo Courtesy of Tom Erdman, 1966*



**Rising Great Lakes water levels and severe storms  
in 1970s caused wetland and island erosion**





Little Tail Point

Long Tail Point

Peter's Marsh

Cat Island Chain

Duck Creek Delta

Peter's Lake

Rock dikes hardened  
the shoreline

Municipal incinerator  
and landfill

Photo Courtesy of Tom Erdman , 1970





Long Tail Point

Cat Island

Bass Islands

Duck Creek Delta Marsh

Landfill

I-43 Construction

90% of Coastal Wetlands  
Lost from Southern  
Green Bay

Agriculture

*Photo by WDNR, 1969*





Cat Island

Willow Island

Lone Tree Island

Green Bay islands during  
high water levels in 1976





Cat Island

An aerial photograph of a large, dark blue lake. In the background, a dense green forest line borders the shore, with some buildings visible on the far left. Three islands are visible in the lake. The largest island, Cat Island, is elongated and has a sandy, light-colored left end and a greener right end. Willow Island is a small, narrow strip of land to the right of Cat Island. Lone Tree Island is a small, triangular island with several trees and a sandy shore, located in the lower center of the frame. The water shows some ripples and reflections.

Willow Island

Lone Tree Island



# Project Development

- The Cat Island Chain project developed out of the 1988 Lower Green Bay Remedial Action Plan (RAP) and was the top priority project for habitat restoration.



Members of the Citizens Advisory Committee and DNR staff worked together to develop the Lower Green Bay Remedial Action Plan. *(Photo by Dave Crehore)*



Draft Report  
Ecosystem Restoration Report and Draft Envir  
Assessment  
November 1999

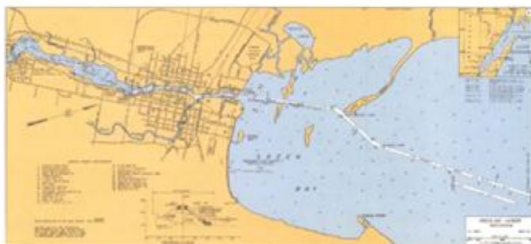
## Cat Islands, Green Bay Harbor Wisconsin

### ENVIRONMENTAL ASSESSMENT

Dredged Material Management Plan  
Green Bay Harbor, Wisconsin

Phase II Report  
Draft Dredged Material Management Plan Study  
and Environmental Assessment  
September 2010

## Green Bay Harbor, Wisconsin Volume I of II



U.S. ARMY CORPS OF ENGINEERS  
DETROIT DISTRICT

## Cat Island Chain Restoration Initial Design Development and Concept Evaluation

Completed for the  
United States Corps of Engineers - Detroit District  
October 2002

DACW35-01-D0009



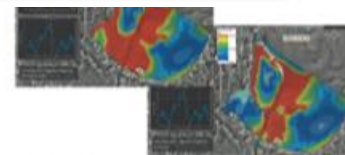
### ENVIRONMENTAL ASSESSMENT

Dredged Material Management Plan  
Green Bay Harbor, Wisconsin



September 2010

U.S. Army Engineer District, Detroit  
Corps of Engineers, CELRE-PL-E  
P.O. Box 1027  
Detroit, Michigan 48231-1027  
313-226-7590



Prepared by  
W.F. Baird & Associates Ltd.  
Madison, Wisconsin  
April 2005



# Cat Island Restoration Project Goals

- Restore diversity of island and aquatic habitats
- Enhance spawning and nursery grounds for various fish species (e.g. yellow perch, musky, pike, walleye, sunfish)
- Create disposal capacity for dredge material for the Port of Green Bay
- Beneficially reuse dredged material
- Recreate 1960s island “footprint”



*Photo by WDNR 1969*



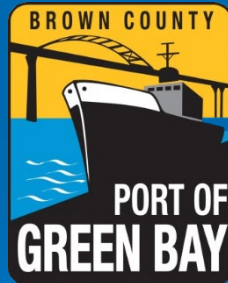
# Project Partners

- Assembled \$34M (state and Federal grants, direct funds from Port, Paper mill restoration funds and US Army Corps of Engineers)

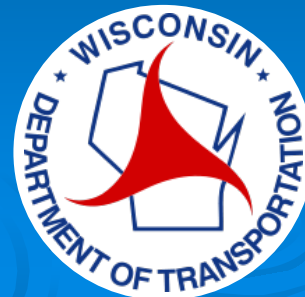
## Cat Island Advisory Committee (CIAC)



US Army Corps  
of Engineers®



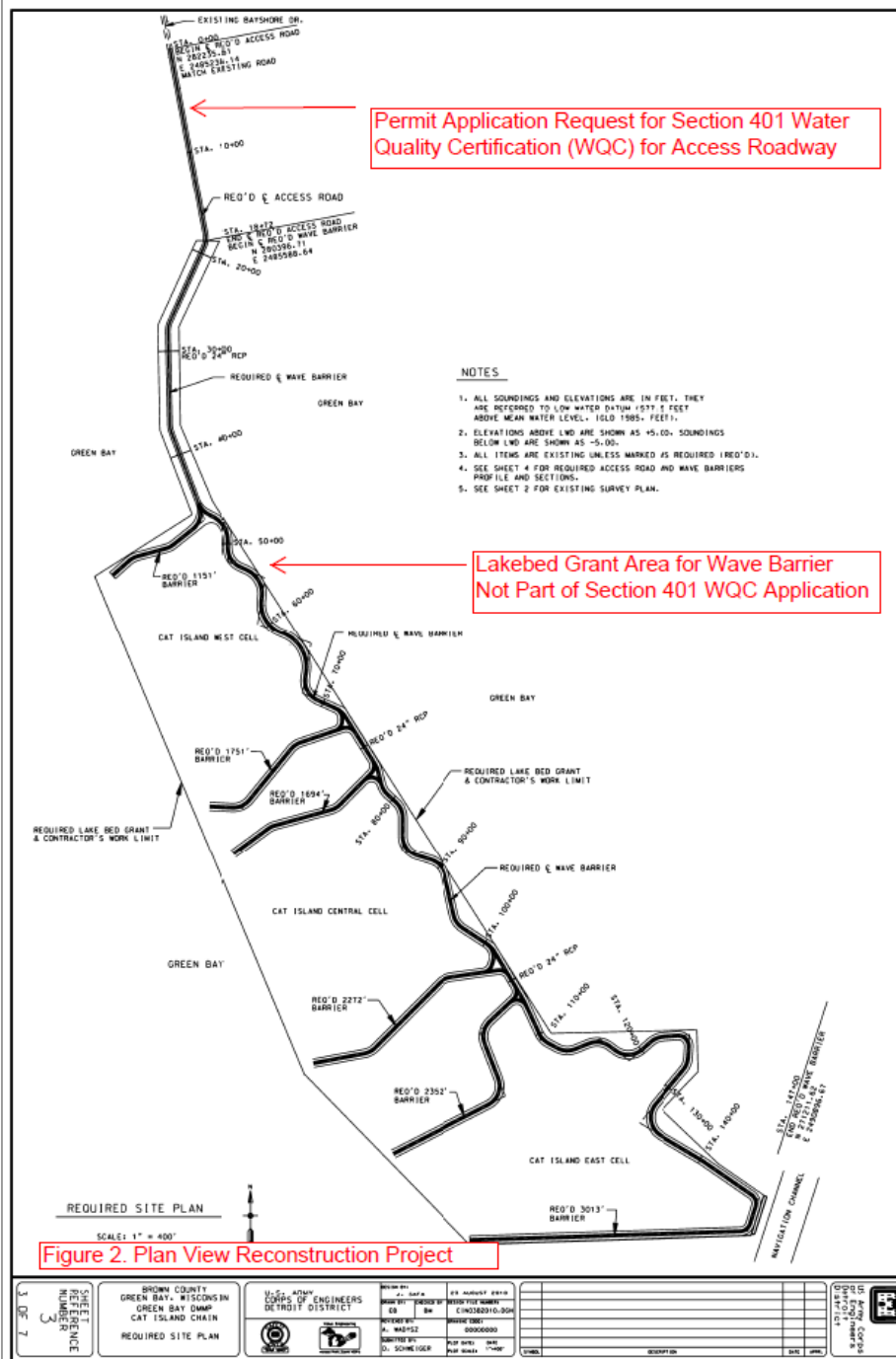
Citizen  
Member













# Spring 2010



50 yds



# Construction Begins Phase I - June 2012





# Construction Phase I - June 2012



Cat Island



# Construction Phase II - October 2012



December 17, 2012







**May 16, 2013**



	Tons	(\$)
Gravel	41,788	\$ 158,379
Core Stone	504,411	\$ 1,743,609
Armor Stone	161,666	\$ 1,611,829
Total	707,865	\$ 3,513,817

**Approx. 34,000 truckloads**

**November 12, 2013  
95% Complete**



# Sediment Disposal

Island	Area (acres)	Storage Capacity (yards <sup>3</sup> )	Years Remaining (assume 2 yr cycles and sequential filling)
West Island	74	900,000	8
Central Island	92	1,140,000	22
East Island	106	1,680,000	40

Only outer harbor “clean sediments” will be placed onto the islands

	Original	Actual
Project Cost	\$ 34,190,889	\$ 19,281,931



September 9, 2014





**May 7, 2015**





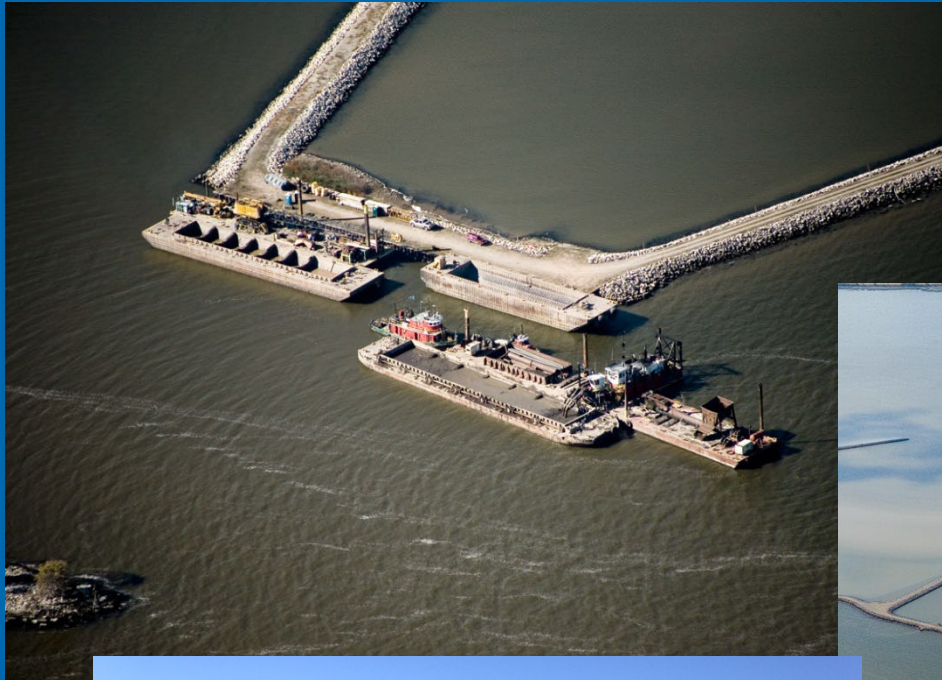
July 2, 2015



Gary Fewless and Bud Harris



October 24, 2016





November 8, 2017





# Aerial View 2020

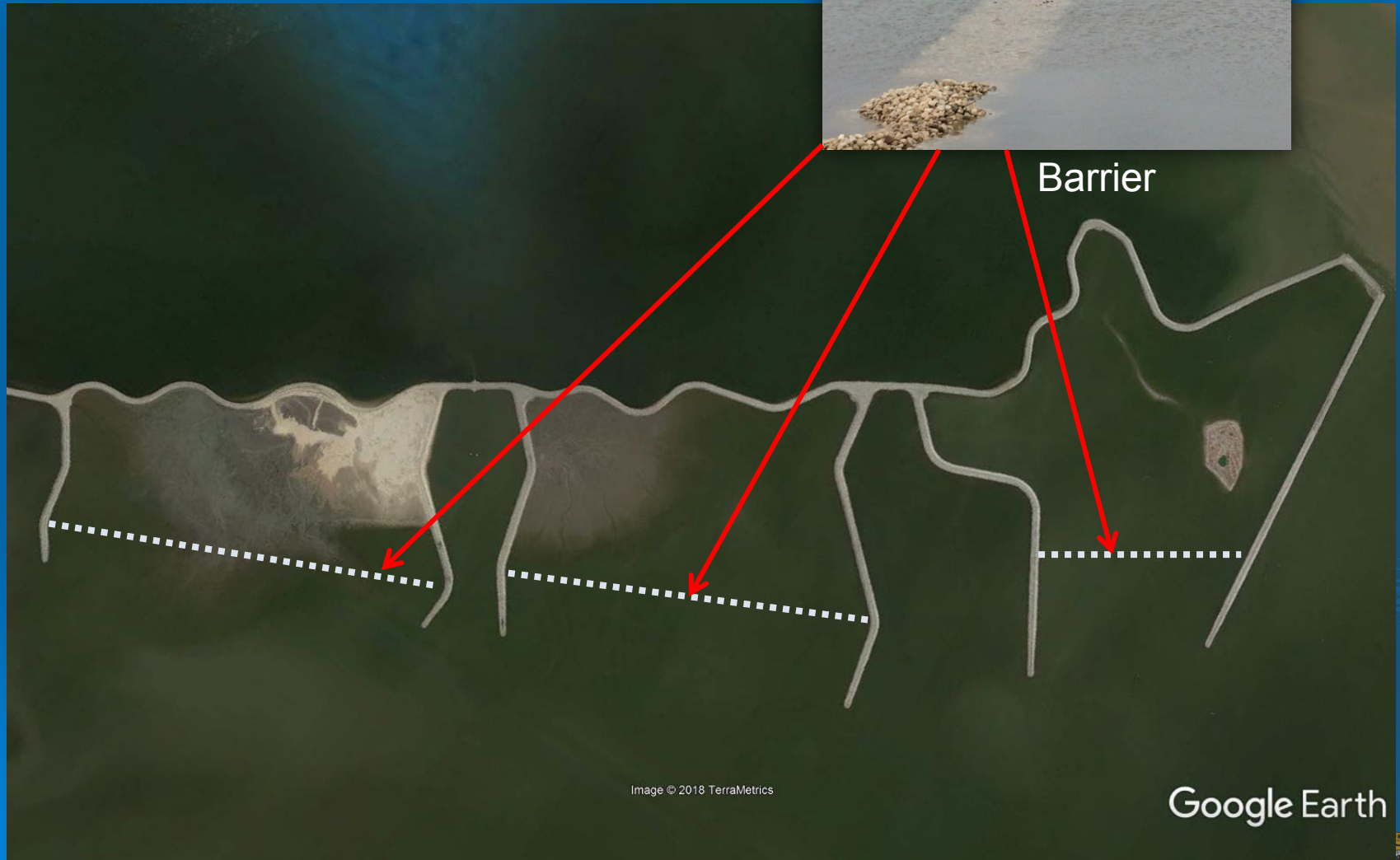




# Barrier Construction



Barrier





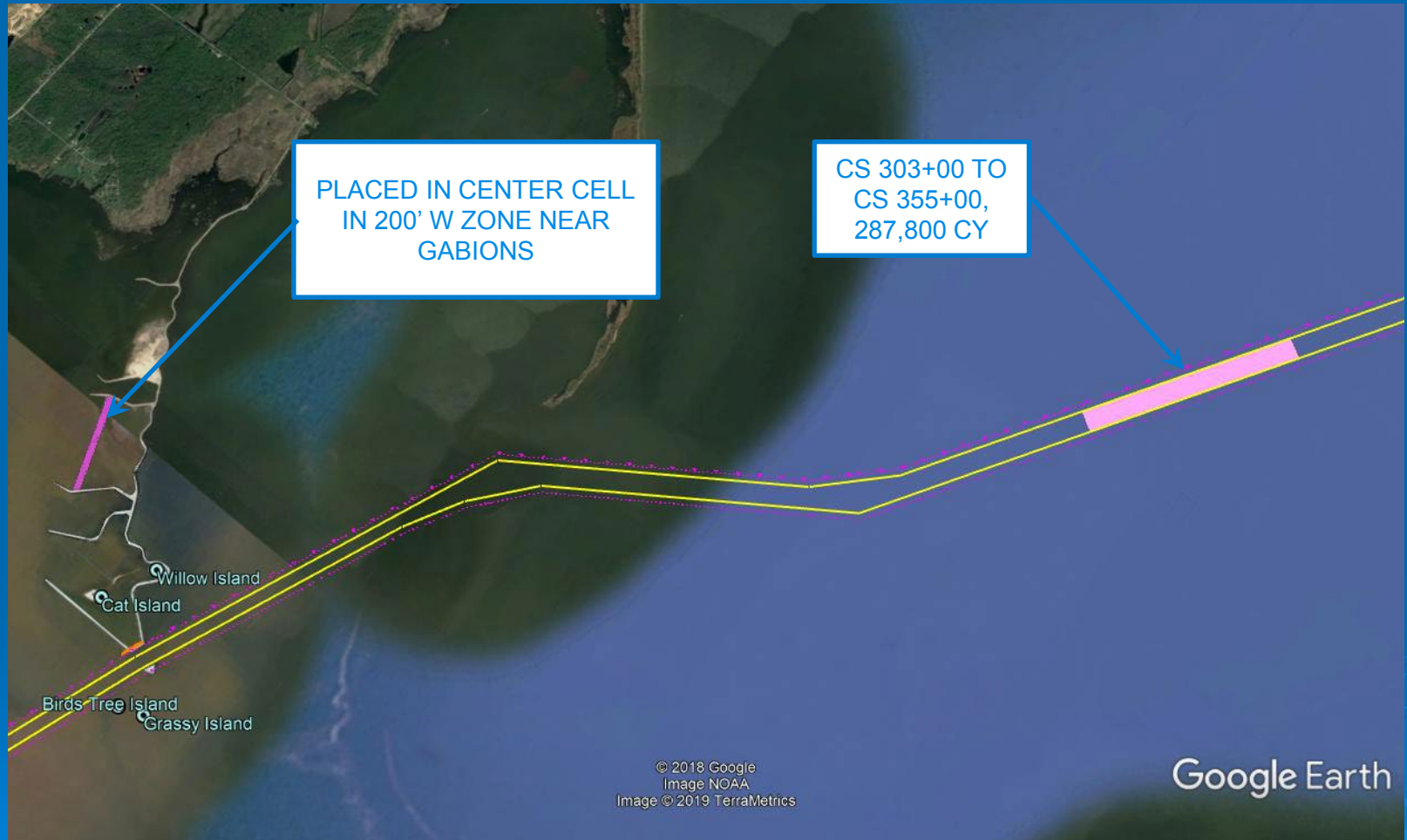
# Center Cell Barrier Installation



**Approximately 2,300 LF of geotextile lined gabion-style barrier placed across the back of the center island**

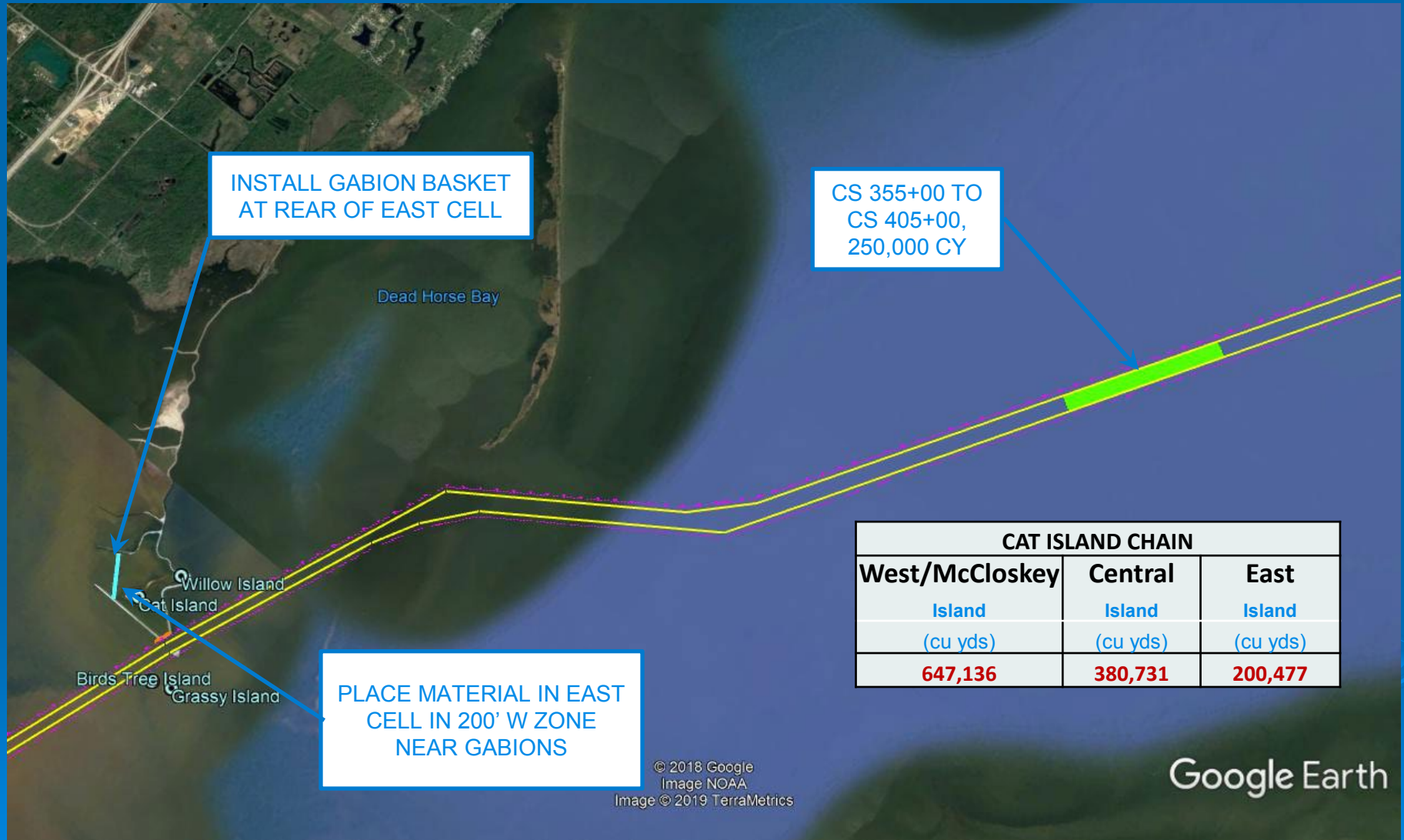


# FY18 DREDGING OVERVIEW





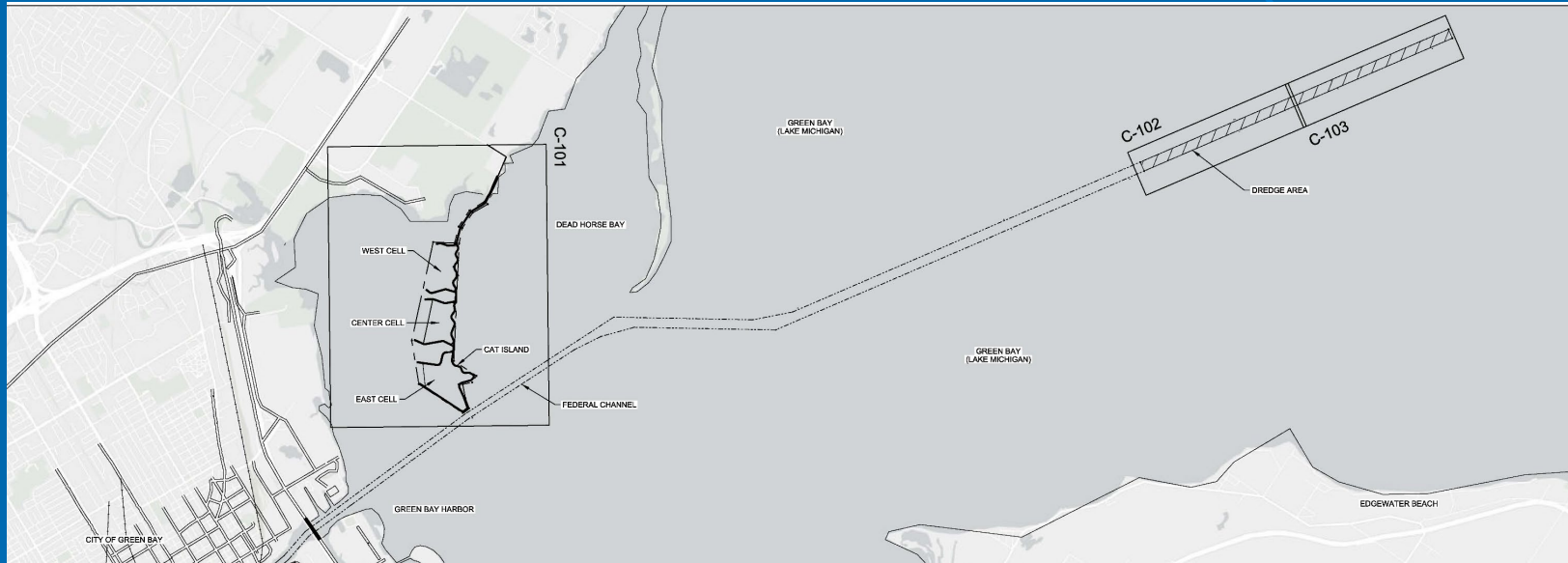
# FY19 DREDGING OVERVIEW





# FY 21 DREDGING OVERVIEW

CS 355+00 TO  
CS 405+00,  
100,000 CY



PLACE MATERIAL IN EAST  
CELL IN 200' W ZONE  
NEAR GABIONS

CAT ISLAND CHAIN		
West/McCloskey	Central	East
Island	Island	Island
(cu yds)	(cu yds)	(cu yds)
<b>647,136</b>	<b>380,731</b>	<b>200,477</b>



# Habitat Impacts



- Colonial Nesting Water Birds
- Shorebirds
- Waterfowl
- Fish Spawning
- Fish Nurseries
- Turtles
- Amphibians
- Invertebrates



## Legend

- Caspian Tern Nesting (200+ nests)
- Black-Crowned Night Heron (75+ Nests)
- Pelican Nesting (1,400+ nests)
- Colonial Waterbird Nesting (8,000 + Nests)
- Common Tern Nesting (45+ nests)
- Piping Plover Nesting

These are floating platforms that are installed (early April) and removed (August-Sept) every season.

Cormorants,  
Pelicans, Gulls

Great Egrets, Cormorants,  
Pelicans, Gulls



Neither the State of Wisconsin, the Department of Natural Resources, nor any of its employees shall be held liable for any improper or incorrect use of the information described and/or contained herein, and they assume no responsibility for anyone's use of the information.  
Date: 3/16/2009

## Title: Cat Island Nesting Locations

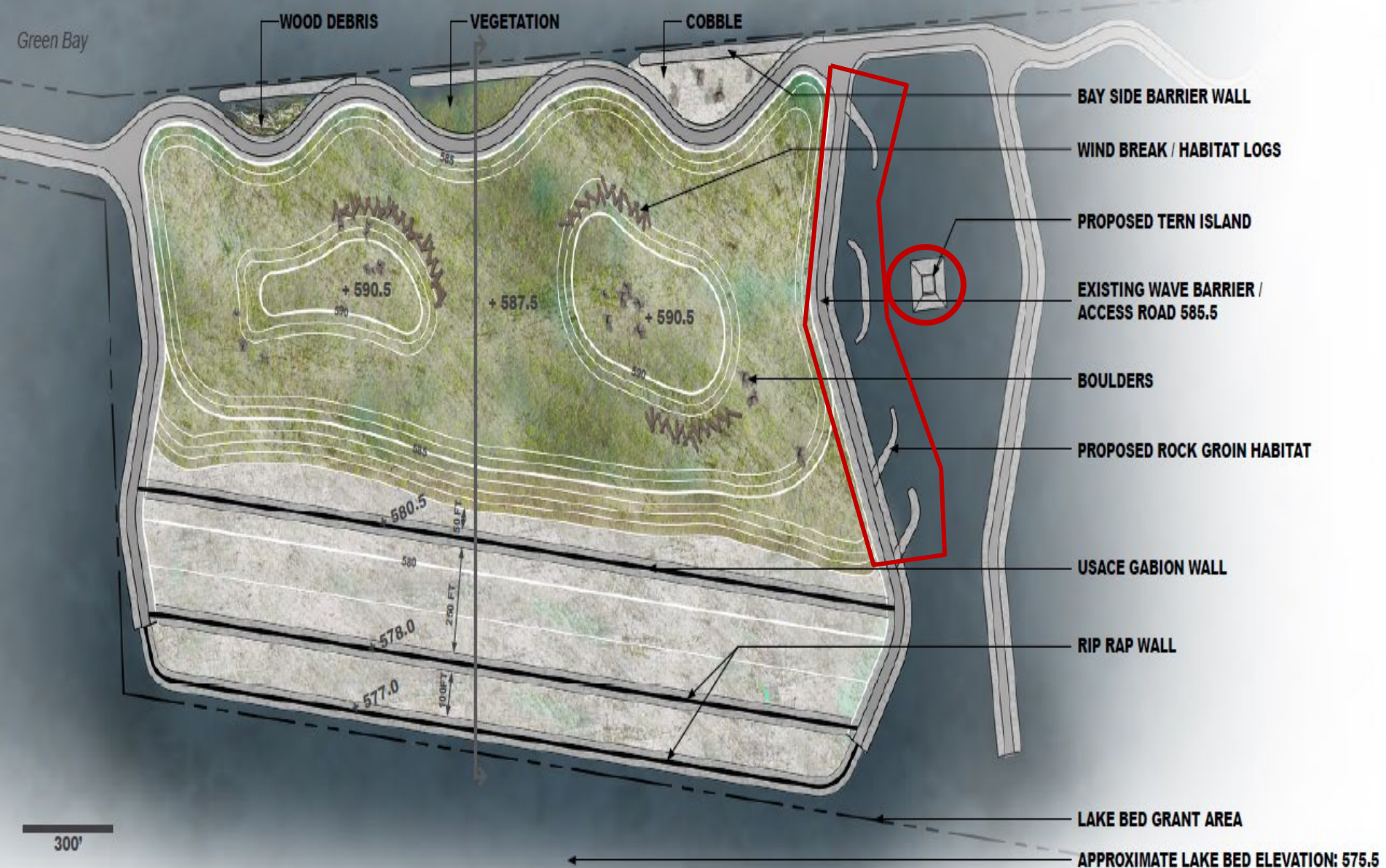
0 0.25 0.5 1 Miles



Aerial Photo 2016



# Habitat Projects





# Tern Platforms





# Piping Plover

- Piping Plover successfully bred on westernmost island since 2016
  - First local breeding in 75+ years





# Bird Use

- Approximately 250 species

- Top-10 site for species diversity in Wisconsin





# Improved Nursery Habitat

- Fish species which rely on structure to hide juvenile fish will benefit from the increase in aquatic vegetation.





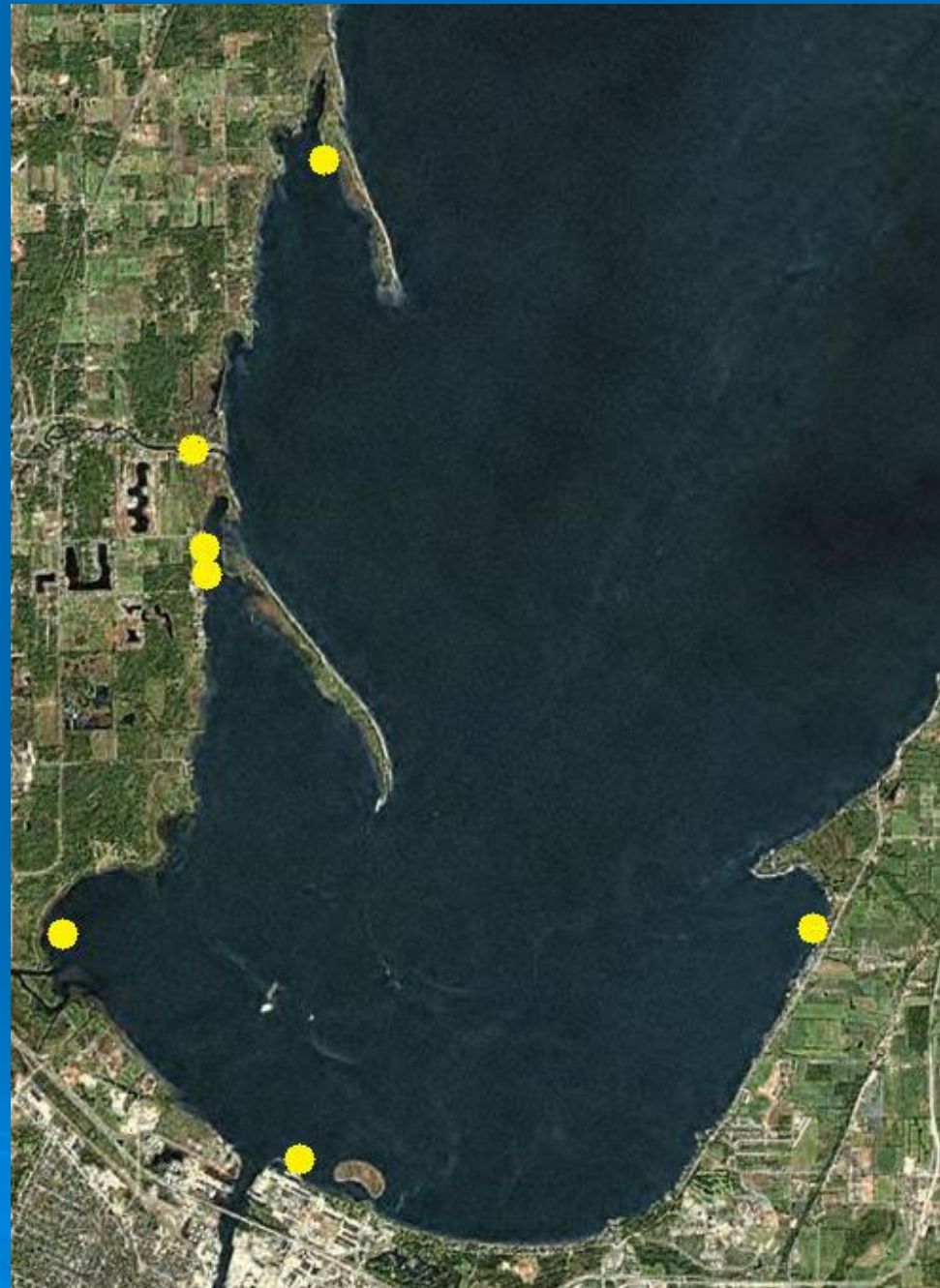
# Sunfish Species

- Sunfish Species; bluegill, largemouth bass, pumpkinseed
- Feeding shift
  - Insectivore → planktivore
  - Insectivore → piscivore
- Adapted to forage in vegetation during insectivore phase





# Muskellunge Spawning Habitat





# Improved Predation

- Visual predators
  - Increased efficiency
- Reduced recruitment of Common Carp
- Reduction in
  - Bullheads
  - Gizzard Shad



*Photo from E. Engbretson*



# Public Access



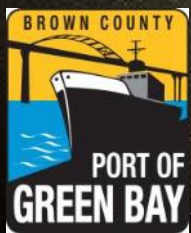


# Project Outcomes

- 30-50 years worth of disposal capacity
- Beneficial reuse of dredged material
- 2.5 mile wave barrier and re-establishment of 272 acres of islands
- Wave barrier protecting 1,225 acres and providing critical habitat for birds, fish and mammals
- Improved water clarity increasing weed growth for fish spawning and serving as a nursery and improved migratory bird sanctuary/lay over



# Questions?



**Dean Haen**

*Brown County Port & Resource  
Recovery Department*